



# ASTRON SPACE PLANE

ASSEMBLY INSTRUCTIONS  
PATENT PENDING

## A NEW AND EXCITING SPACE AGE MODEL....

THE ASTRON SPACE PLANE INTRODUCES A NEW CONCEPT IN THE FIELD OF ROCKET POWERED MODELS. IT IS A COMBINATION AIRPLANE AND ROCKET. THE ASTRON SPACE PLANE IS PATTERNED AFTER SPACE EXPLORATION PROJECTS SUCH AS THE DYNA SOAR WHICH PROPOSES TO BOOST A MAN-CARRYING CRAFT INTO SPACE AND THEN RETURN BY GLIDING BACK THROUGH THE ATMOSPHERE TO MAKE A SAFE LANDING.

FOR SOME OF YOU, BUILDING THE ASTRON SPACE PLANE WILL BE YOUR FIRST ATTEMPT TO BUILD A GLIDER; FOR OTHERS THIS WILL BE YOUR FIRST ATTEMPT TO BUILD A ROCKET; STILL OTHERS MAY BUILD THE ASTRON SPACE PLANE AS THE FIRST PROJECT OF EITHER TYPE. IN ANY EVENT, REGARDLESS OF YOUR PREVIOUS EXPERIENCE, YOU WILL NEED TO READ CAREFULLY EVERY DETAIL OF THE INSTRUCTIONS. ALSO, IT WILL BE HELPFUL IF YOU DO NOT TRY TO HURRY. EVERY PATTERN AND PART SHOULD BE CUT OUT VERY CAREFULLY, EXACTLY FOLLOWING THE LINES INDICATED. CLOSE ATTENTION TO DETAIL MUST BE ADHERED TO WHEN ALIGNING THE WINGS, STABILIZERS, ELEVONS, SPIN TABS, ETC. AN EXACT BALANCE OF WEIGHT AND FRONTAL AREA IS EXTREMELY IMPORTANT FOR A GOOD FLIGHT. THE SPIN TABS MUST BE ALIGNED EXACTLY SO THAT THE STABILIZING SPIN INDUCED DURING THE ROCKET POWERED FLIGHT WILL BE A TRUE, EVEN SPIN AROUND THE LONGITUDINAL AXIS OF THE ROCKET BODY. REMEMBER: IT IS MORE IMPORTANT TO DO A GOOD JOB THAN TO GET IT DONE IN ONE DAY OR ONE AFTERNOON.

## HERE'S WHAT YOU GET IN THE KIT.....

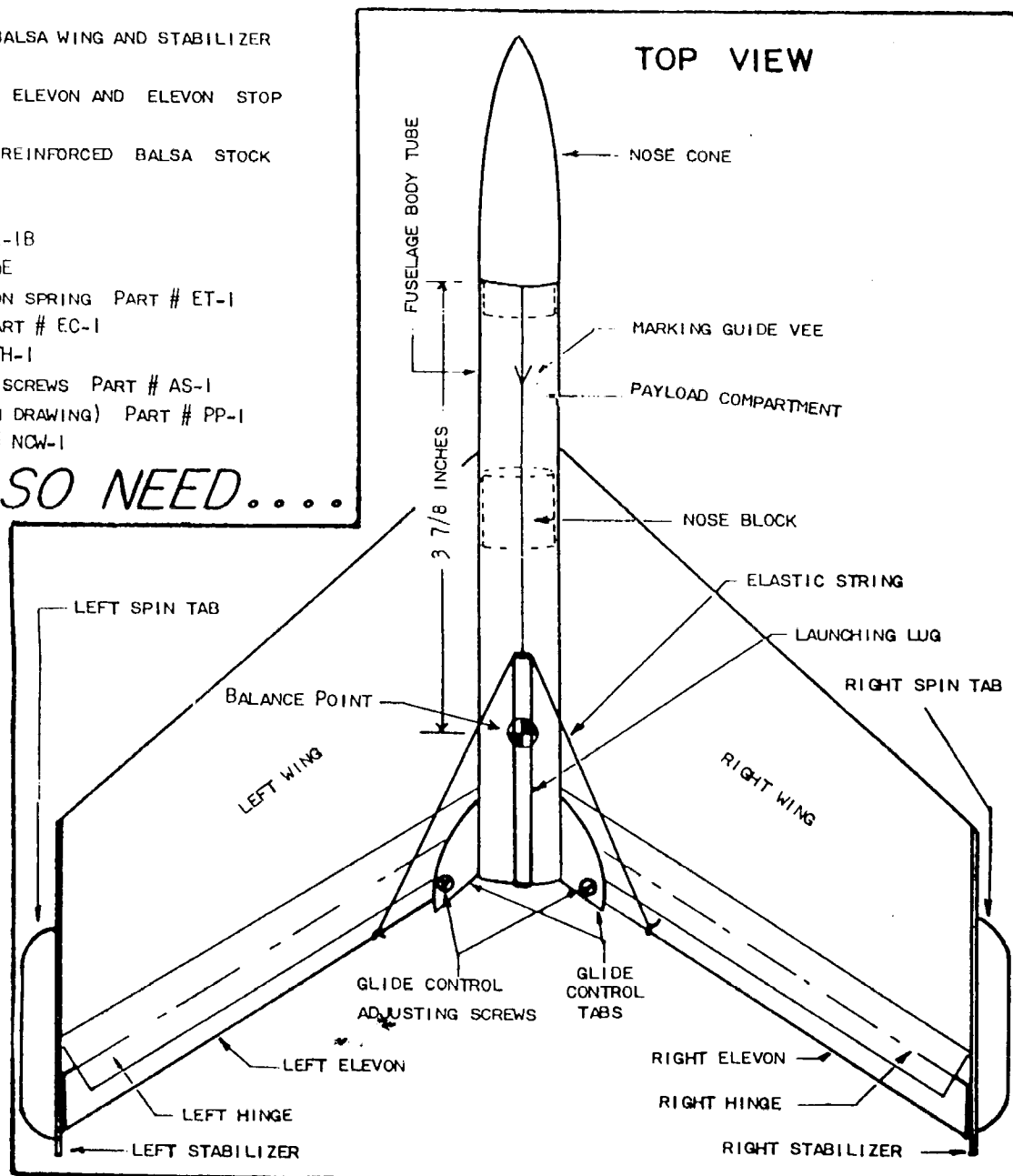
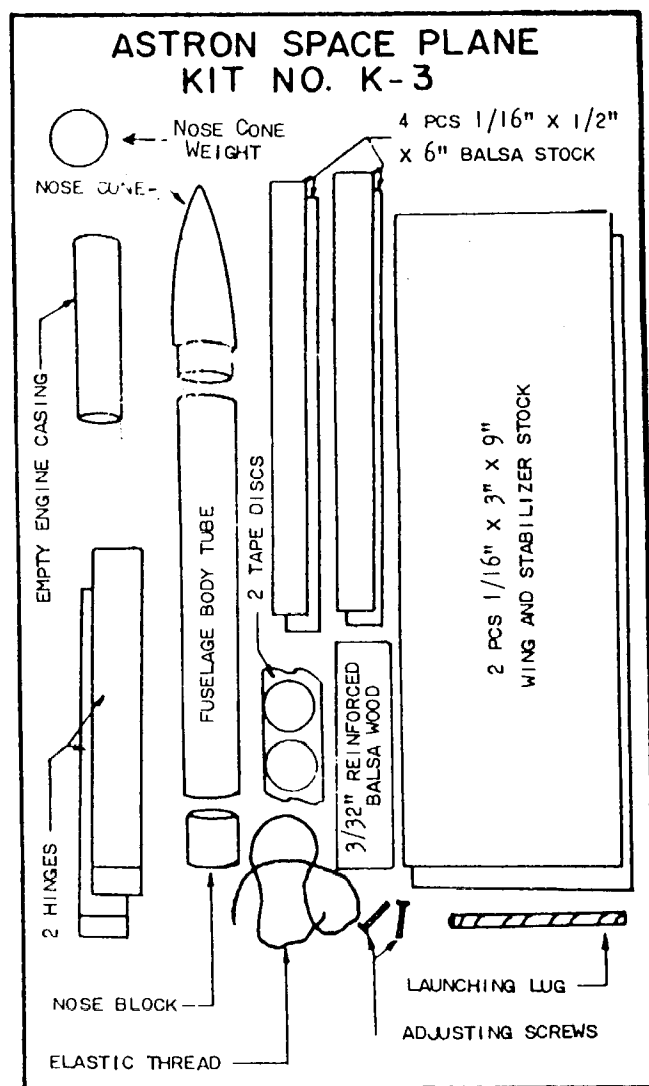
THE ASTRON SPACE PLANE KIT CONSISTS OF THE FOLLOWING PARTS AS ILLUSTRATED IN THE DRAWING ABOVE RIGHT:

- (1) BODY TUBE PART # BT-30C
- (2) NOSE BLOCK PART # NB-30
- (3) 2 PIECES 1/16" X 3" X 9" BALSA WING AND STABILIZER STOCK PART # BFS-20
- (4) 4 PIECES 1/16" X 1/2" X 6" ELEVON AND ELEVON STOP STOCK PART # BFS-20B
- (5) 1 PIECE 3/32" X 3/4" X 3" REINFORCED BALSA STOCK PART # RBS-1
- (6) 2 TAPE DISCS PART # TD-1
- (7) 1 LAUNCHING LUG PART # LL-1B
- (8) 1 NOSE CONE PART # ENC-30E
- (9) 1 ELASTIC THREAD FOR ELEVON SPRING PART # ET-1
- (10) 1 REJECT ENGINE CASING PART # EC-1
- (11) 2 HINGES (TAPE) PART # TH-1
- (12) 2 GLIDE CONTROL ADJUSTING SCREWS PART # AS-1
- (13) PATTERN PAGE (NOT SHOWN IN DRAWING) PART # PP-1
- (14) 1 NOSE CONE WEIGHT PART # NCW-1

## YOU WILL ALSO NEED.....

IN ADDITION TO THE MATERIALS LISTED YOU WILL NEED THE FOLLOWING:

1. SHARP MODELING KNIFE OR SINGLE EDGE RAZOR BLADE.
2. RAZOR SAW, SUCH AS THE ZONA SAW (THIS IS OPTIONAL, BUT IT WILL GREATLY FACILITATE CUTTING THE BALSA WOOD.)
3. EXTRA STRONG CEMENT. (AMBROID EXTRA STRONG CEMENT OR ELMERS WHITE GLUE IS EXCELLENT.)
4. BALL POINT PEN OR PENCIL.
5. SCISSORS.
6. FINE GRIT SANDPAPER.
7. PAINT AND DOPE FOR FINISHING THE MODEL.



# BEFORE YOU MARK, CUT, OR GLUE.....

READ THE COMPLETE INSTRUCTIONS. AS YOU READ, LOOK AT THE ILLUSTRATIONS AND PATTERN PAGE. STUDY AND IDENTIFY EACH

PART. LEARN THE NAMES AND TRY TO FIGURE OUT WHERE YOU WILL PUT EACH PART WHEN YOU START TO ASSEMBLE THE GLIDER.

## MARK AND CUT EACH PART WITH CARE.....

CUT OUT ALL OF THE BALSA PARTS PATTERNS # 2 THROUGH # 10. DO NOT CUT OUT # 1 OR ANY OF THE DRAWINGS WHICH ARE NOT MARKED FOR PATTERNS.

USING A BALL POINT PEN, OUTLINE EACH PATTERN ON THE PROPER PIECE OF BALSA WOOD AS INDICATED ON THE PATTERN SHEET. BE SURE TO TRANSFER ALL ASSEMBLY GUIDE MARKINGS TO THE BALSA WOOD PART AS INDICATED. BEFORE CUTTING ANY OF THE PIECES, BE SURE ALL OF THE PARTS HAVE BEEN COMPLETELY MARKED OUT.

THE SCREW HOLES IN THE CONTROL TABS ARE TO BE PUNCHED WITH A BALL POINT PEN OR SHARP PENCIL. TO AVOID SPLITTING, PUNCH THESE HOLES, AND THREAD THE SCREWS THROUGH THEM BEFORE CUTTING THEM OUT OF THE BALSA STOCK. CAREFULLY CUT OUT EACH PIECE USING A MODELING KNIFE, SINGLE EDGE RAZOR

BLADE OR RAZOR SAW. CHECK EACH RIGHT HAND PART AGAINST ITS IDENTICAL LEFT HAND PART. SAND OR TRIM UNTIL THE MATCHING PARTS ARE EXACTLY THE SAME SHAPE AND SIZE.

AFTER YOU ARE THROUGH CUTTING, CHECK TO BE SURE YOU HAVE THE FOLLOWING BALSA WOOD PARTS:

- |   |                         |
|---|-------------------------|
| 2. 2 WINGS  | 8. 1 FRONT LANDING SKID |
| 3. 1 RIGHT STABILIZER   | 9. 2 ELEVON LOCK TABS   |
| 4. 1 LEFT STABILIZER  | 10. 2 SPIN TABS         |
| 5. 2 ELEVONS WITH HOLES PUNCHED FOR ELASTIC THREAD  |                         |
| 6. 2 ELEVON STOPS   |                         |
| 7. 2 CONTROL TABS WITH HOLES PUNCHED FOR SCREWS AND SCREWS THREADED THROUGH AS INDICATED IN THE 'GLIDE CONTROL CENTER' DRAWING. |                         |

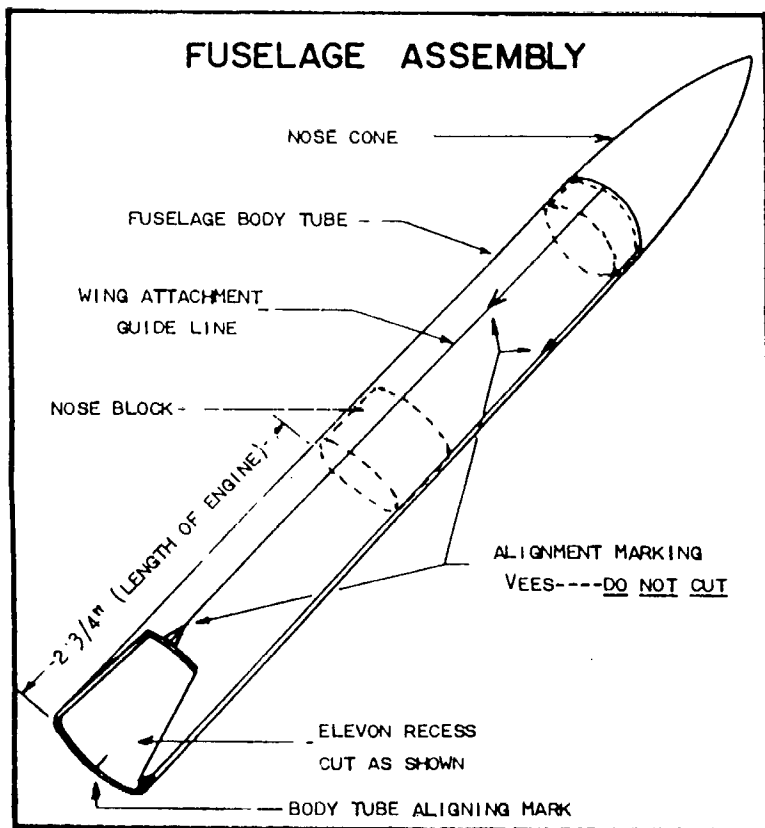
## CAREFULLY CUT AND ASSEMBLE THE FUSELAGE....

CUT OUT THE BODY TUBE MARKING GUIDE (PATTERN # 1). CAREFULLY CUT AROUND THE OUTSIDE EDGES, MAKING EACH NOTCH AS INDICATED. WRAP THIS MARKING GUIDE TIGHTLY AROUND THE BODY TUBE. ALIGN THE MARKING GUIDE SO THAT THE REAR OF THE GUIDE IS EXACTLY EVEN AND STRAIGHT WITH THE REAR END OF THE BODY TUBE. TAPE THE MARKING GUIDE IN PLACE WITH SCOTCH TAPE. USING A BALL POINT PEN OR PENCIL MARK AROUND THE ELEVON RECESS. ALSO, MARK THE VEE SHAPED ALIGNMENT MARKS ON EACH END OF THE MARKING GUIDE. REMOVE THE MARKING GUIDE.

EXAMINE THE BODY TUBE FOR CORRECT MARKINGS. THERE SHOULD BE A LARGE AREA MARKED WHICH IS TO BE CUT OUT TO MAKE THE ELEVON RECESS AND A TOTAL OF EIGHT VEE SHAPED MARKS TO BE USED AS GUIDES FOR MARKING THE BODY TUBE WITH ALIGNMENT LINES. USING A STRAIGHT EDGE, MAKE THE FOUR PARALLEL MARKS ALONG THE ENTIRE LENGTH OF THE BODY TUBE. CUT OUT THE ELEVON RECESS AS SHOWN IN THE DRAWING.

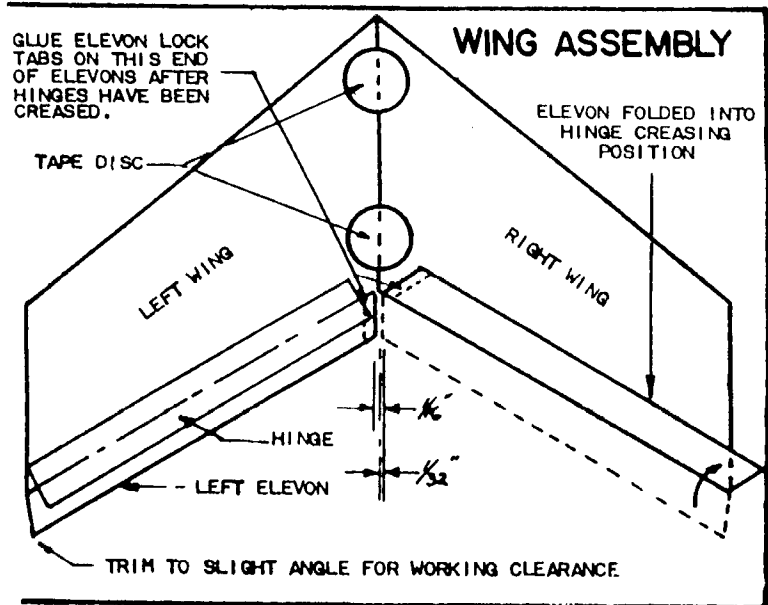
THE EMPTY ENGINE CASING WHICH IS INCLUDED WITH THIS KIT IS ONE WHICH IS DEFECTIVE AND HAS BEEN REJECTED FROM OUR MANUFACTURING OPERATION. IT IS TO BE USED FOR MEASURING PURPOSES ONLY, TO HELP POSITION THE NOSE BLOCK IN THE PROPER POSITION.

THE NOSE BLOCK IS TO BE GLUED INTO POSITION  $2\frac{3}{4}$ " FROM THE REAR OF THE BODY TUBE. SEE ILLUSTRATION. PLACE A LARGE DAB OF GLUE NEAR THE END OF YOUR LITTLE FINGER. REACH THROUGH THE REARWARD END (END WITH THE ELEVON-RECESS CUT-OUT) OF THE BODY TUBE AND SPREAD THE GLUE AROUND THE INSIDE OF THE BODY TUBE AS FAR FORWARD AS POSSIBLE. BE VERY CAREFUL NOT TO GET ANY OF THE GLUE NEAR THE REARWARD END OF THE BODY TUBE. INSERT THE NOSE BLOCK IN THE END OF THE BODY TUBE. THEN, USING THE ENGINE CASING, PUSH IT FORWARD UNTIL THE END OF THE ENGINE CASING IS JUST EVEN WITH THE REARWARD END OF THE BODY TUBE. CAUTION: ONCE



YOU HAVE INSERTED THE NOSE BLOCK FAR ENOUGH TO COME IN CONTACT WITH THE GLUE, DO NOT ALLOW IT TO STOP UNTIL IT IS IN THE PROPER POSITION. SOME GLUES SET VERY QUICKLY, AND STOPPING FOR AS LONG AS A SECOND MAY CAUSE IT TO "FREEZE" IN THE WRONG PLACE. REMOVE THE ENGINE CASING AS SOON AS THE NOSE BLOCK IS IN PLACE. INSERT THE NOSE CONE IN THE FORWARD END OF THE BODY TUBE AS SHOWN.

## THEN BUILD SOME WINGS TO MAKE IT FLY.....

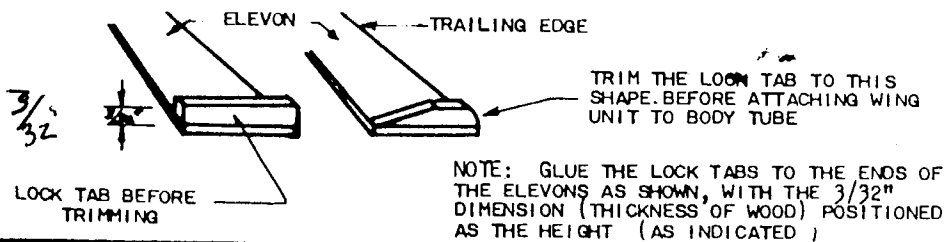


PLACE THE ROOT ENDS OF THE WINGS TIGHTLY TOGETHER AND SECURE WITH THE TWO TAPE DISCS AS SHOWN. LAY THE ELEVONS IN POSITION SO THAT  $\frac{1}{16}$ " CLEARANCE IS PROVIDED BETWEEN THE ENDS OF THE ELEVONS. A GOOD WAY TO OBTAIN EXACTLY  $\frac{1}{16}$ " IS TO USE A PIECE OF  $\frac{1}{16}$ " SCRAP BALSA AS A THICKNESS GAUGE. SPACE THE ELEVONS SO THEY ARE EQUALLY DISTANT ( $\frac{1}{32}$ ") FROM THE PROJECTED CENTER LINE BETWEEN THE TWO WING SECTIONS. PUSH THE ELEVON FIRMLY AGAINST THE REAR EDGE OF THE WING AND APPLY THE HINGES AS INDICATED.

CAREFULLY PRESS ALL OF THE HINGE SURFACE AGAINST THE BALSA WOOD TO BE SURE IT IS SECURELY FASTENED. (DO NOT ATTEMPT TO REMOVE THE HINGE TAPE ONCE IT HAS TOUCHED THE WOOD. IT WILL NOT STICK THE SECOND TIME.)

IT IS IMPORTANT THAT THE HINGES BE CREASED ALONG THE HINGE LINE. TO DO THIS, FOLD THE ELEVON BACK OVER THE WING AND PRESS TO MAKE A STRAIGHT, UNIFORM CREASE. AFTER PROPERLY

## ELEVON LOCK TAB ASSEMBLY



CREASING THE ELEVONS WILL NO LONGER WANT TO LIE FLAT, BUT WILL WANT TO SPRING UP BY THEMSELVES.

AFTER THE ELEVON HINGES HAVE BEEN CREASED, THE ELEVON LOCK TABS ARE TO BE GLUED ONTO THE TOP SIDE OF THE ELEVONS AS SHOWN. (THE TOP SIDE IS THE ONE WHICH HAS THE HINGES AND TAPE DISC ON IT.) AFTER THE GLUE HAS DRIED, TRIM TO THE SHAPE ILLUSTRATED.

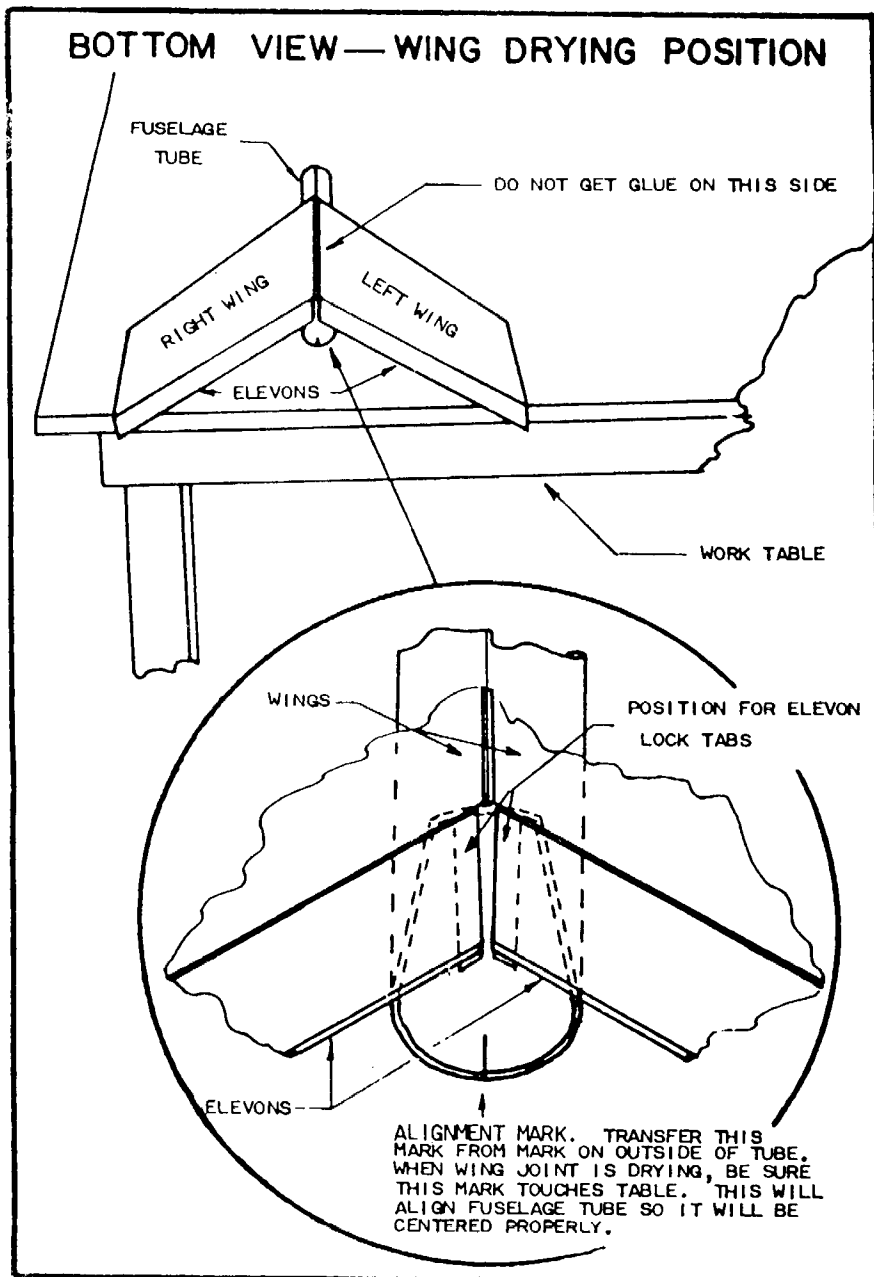
## NOW GLUE THE WINGS TO THE FUSELAGE.....

THE AMOUNT OF DIHEDRAL ANGLE IS VERY CRITICAL. (BY THE DIHEDRAL ANGLE WE REFER TO THE ANGLE MADE BY THE WINGS AND THE BODY TUBE WHERE THE WINGS POINT SLIGHTLY UPWARD RATHER THAN STRAIGHT OUT. THIS ANGLE IS INDICATED ON THE REAR VIEW DRAWING.) THE ASTRON SPACE PLANE HAS BEEN DESIGNED AND PROPORTIONED TO FLY WITH A DIHEDRAL ANGLE SUFFICIENT TO BRING THE OUTER EDGE OF THE WINGS EXACTLY EVEN WITH THE TOP OF THE FUSELAGE BODY TUBE. THE FOLLOWING METHOD WILL PROVIDE EXACTLY THE RIGHT AMOUNT OF DIHEDRAL ANGLE.

LAY THE WING SECTION WITH THE TAPE DISCS UP AND PLACE A THICK, HEAVY STRIP OF GLUE ACROSS THE TAPE DISCS AND ALONG THE ROOT JOINT BETWEEN THE TWO WING SECTIONS. DO NOT GET GLUE ON THE ELEVONS OR ON THE BACK OR BOTTOM SURFACES OF THE WINGS. NEXT, TURN THE WINGS OVER AND LAY THE WINGS ON THE FUSELAGE BODY TUBE SO THAT THE GLUED AREA MAKES CONTACT WITH THE TUBE AND THE JOINT BETWEEN THE TWO WINGS EXACTLY FOLLOWS THE ALIGNMENT MARK ON THE TUBE. (SEE DRAWING) THE BACK EDGES OF THE WINGS ARE TO BE EVEN WITH THE FORWARD EDGE OF THE ELEVON RECESS CUT-OUT. THE TRAILING EDGE OF THE ELEVONS THEN WILL BE APPROXIMATELY EVEN WITH THE REAR EDGE OF THE TUBE.

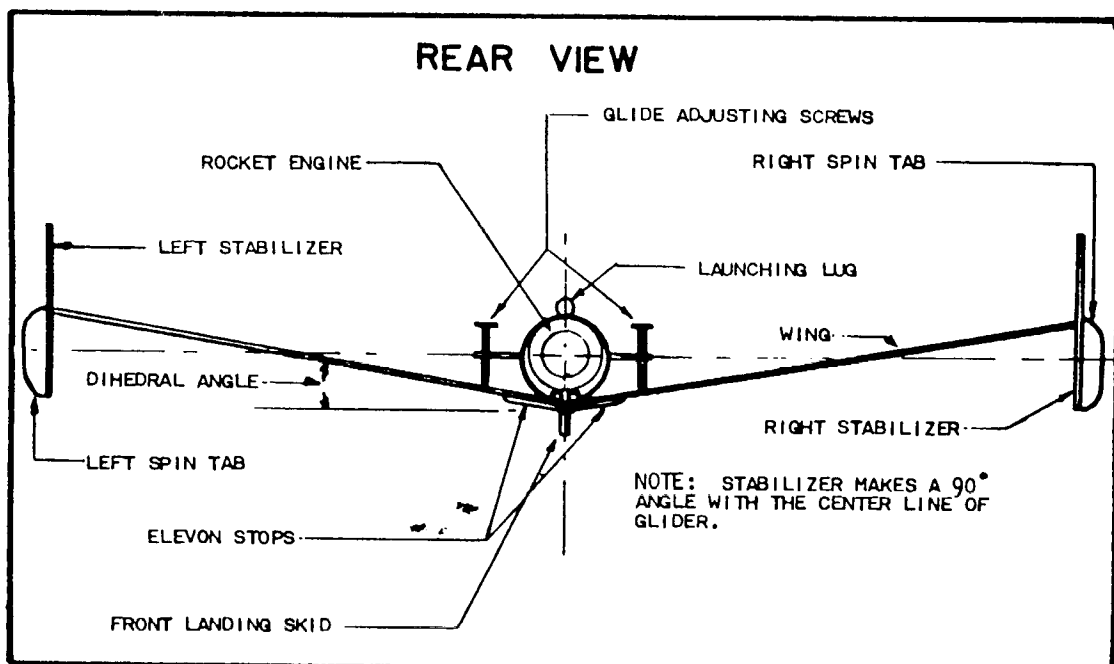
PRESS THE GLUE JOINT FIRMLY TO BE SURE THE WINGS ARE SET EVENLY AND TIGHTLY AGAINST THE FUSELAGE BODY TUBE. THEN LAY THE MODEL ASIDE TO DRY WITH THE ELEVONS PROJECTING OVER THE EDGE OF THE WORK TABLE AS SHOWN.

WHILE THE MODEL IS DRYING, THE WING TIPS AND THE COMPLETE LENGTH OF THE BODY TUBE SHOULD BE LYING FLAT AGAINST THE TABLE. DO NOT HANDLE THE MODEL UNTIL THIS GLUE JOINT IS COMPLETELY DRY. THIS WILL TAKE FROM ONE HOUR TO SEVERAL HOURS, DEPENDING UPON THE TYPE OF GLUE USED, THE TEMPERATURE, AND THE HUMIDITY IN THE AIR. DO NOT MOVE OR HANDLE UNTIL IT IS COMPLETELY DRY.



## OOPS! DON'T FORGET THE STABILIZERS.....

THE STABILIZER PATTERNS HAVE MARKINGS WHICH SHOW WHERE THE WING TIPS AND THE SPIN TABS ARE TO BE ATTACHED. WHEN PROPERLY MARKED, EACH STABILIZER SHOULD HAVE A GUIDE MARK ON THE INSIDE OF THE STABILIZER FOR ATTACHING TO THE WING TIPS AND A GUIDE MARK ON THE OUTSIDE OF THE STABILIZER FOR POSITIONING THE SPIN TAB. AFTER THE WING AND BODY TUBE JOINT HAS DRIED THOROUGHLY, GLUE THE STABILIZERS IN PLACE. THE STABILIZERS SHOULD HAVE THE POINTED ENDS FORWARD AND BE POSITIONED EVEN WITH THE LEADING EDGE OF THE WING. THE VERTICAL STABILIZERS SHOULD BE ALIGNED SO THAT

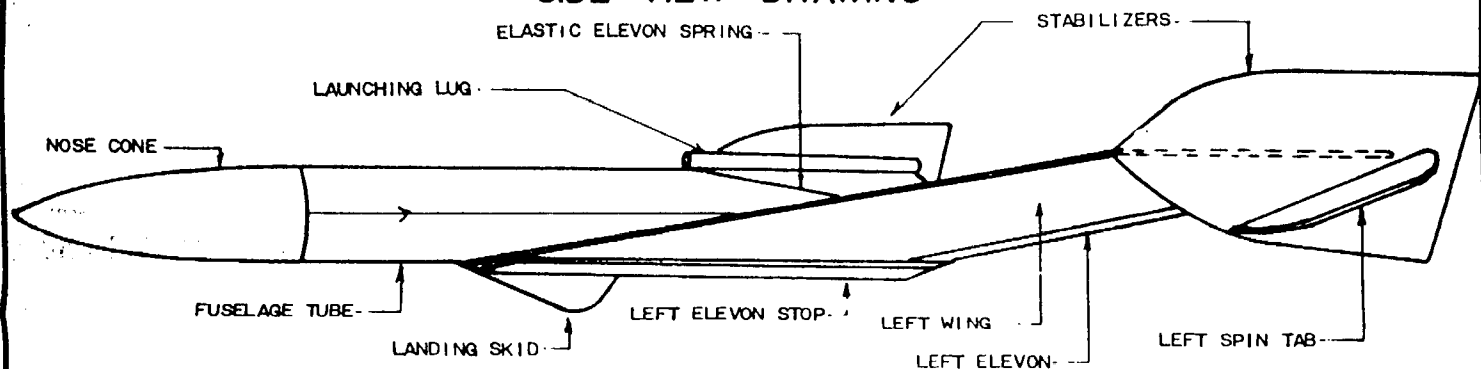


WHEN THE GLIDER IS IN A HORIZONTAL POSITION THE STABILIZERS SET VERTICALLY AND PARALLEL TO EACH OTHER AS SHOWN IN THE REAR VIEW DRAWING.

GLUE THE SPIN TABS ALONG THE LINES MARKED ON THE LOWER

HALF OF THE STABILIZERS (BELOW THE WING ATTACHING LINE), AND POSITION IN OPPOSING DIRECTIONS AS INDICATED IN THE DRAWINGS SO THAT THEY WILL WORK TOGETHER FROM OPPOSITE SIDES TO PRODUCE A SPINNING ACTION WHEN THE VEHICLE IS IN POWERED FLIGHT.

## SIDE VIEW DRAWING



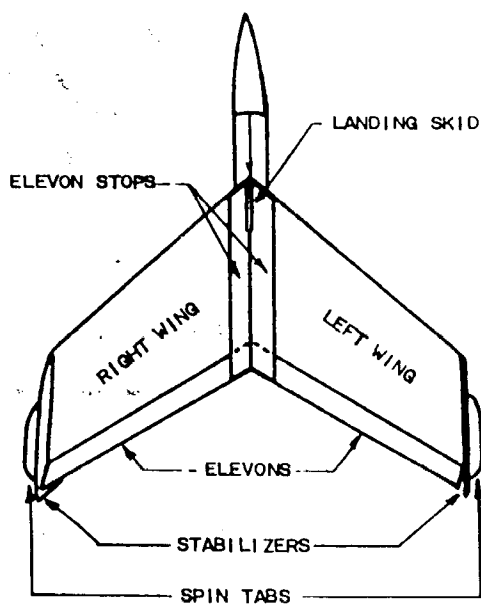
NOTE: THE RIGHT AND LEFT SPIN TABS ARE TO BE SECURED IN OPPOSING DIRECTIONS. BE SURE TO PLACE THE SPIN TABS ON THE LOWER HALF OF THE STABILIZERS AS SHOWN. USE THE GUIDE MARKS ON THE PATTERN.

## JUST FOUR MORE PARTS AND THEN YOU ARE THROUGH.....

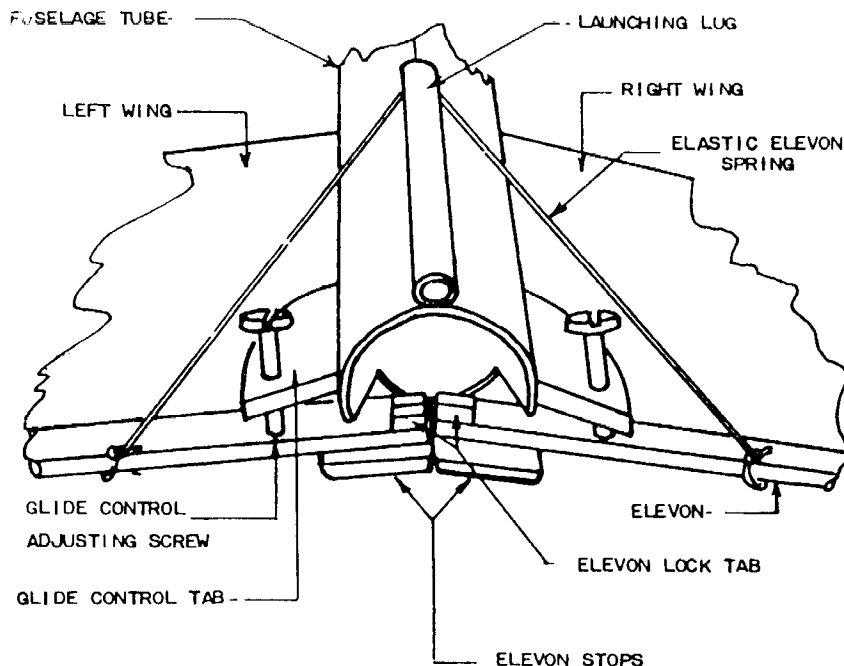
INSTALL THE CONTROL TABS FOLLOWING THE MARKINGS ON THE SIDE OF THE FUSELAGE TUBE WITH THE REAR EDGE OF THE ATTACHED PORTION OF THE TABS EVEN WITH THE END OF THE TUBE. (SEE GLIDE CONTROL CENTER, REAR, AND TOP VIEW DRAWINGS.) GLUE THE LAUNCHING LUG ALONG THE MARK ON TOP OF THE BODY TUBE AND WITH THE REAR END OF THE LUG EVEN WITH THE REAR END OF THE BODY TUBE.

RUN THE ELASTIC THREAD THROUGH THE HOLES PUNCHED IN THE TRAILING EDGE OF THE ELEVONS. TIE EACH END SECURELY. LEAVE THE THREAD LONG ENOUGH TO REACH ABOUT HALF WAY UP THE LAUNCHING LUG WHEN IT IS IN AN UNSTRETCHED CONDITION. WHEN THE LAUNCHING LUG JOINT HAS

## BOTTOM VIEW



## GLIDE CONTROL CENTER



DRIED COMPLETELY, HOOK THE ELASTIC THREAD LOOP OVER THE FORWARD END OF THE LUG.

GLUE THE ELEVON STOP STRIPS ON EACH SIDE OF THE ROOT JOINT OF THE WINGS AS SHOWN IN THE BOTTOM VIEW DRAWING. FILL THE WING ROOT JOINT (CRACK BETWEEN THE WINGS) AND THE CRACK BETWEEN THE ELEVON STOP STRIPS WITH GLUE. ALSO, COAT THE EXPOSED OUTER SURFACE OF THE ELEVON STOP STRIPS WITH GLUE. THE GLUE COATING ON THE OUTER SURFACE IS EXTREMELY IMPORTANT AND IS TO PREVENT WARPING OF THE STOP STRIP. IF GLUE IS APPLIED TO ONLY ONE SIDE IT WILL CAUSE THE ENDS OF THE STOP STRIP TO CURL UP. IF THIS HAPPENS, THE ALIGNMENT OF THE ELEVONS WILL BE INCORRECT IN THE STRAIGHT-LOCKING-POSITION AND THE ASTRON SPACE PLANE WILL NOT FLY PROPERLY UNDER POWER.

GLUE THE LANDING SKID INTO THE POSITION INDICATED IN THE SIDE VIEW DRAWING.

## FOLLOW THE SAFETY CODE.....

ALWAYS FOLLOW THE N.A.R. (NATIONAL ASSOCIATION OF ROCKETRY) SAFETY CODE WHEN LAUNCHING ANY ROCKET POWERED MODEL. DO NOT LAUNCH IN HIGH WINDS OR NEAR FLYING AIRCRAFT. NEVER LAUNCH A ROCKET POWERED MODEL AROUND CONGESTED AREAS OR AROUND PERSONS NOT DIRECTLY INVOLVED WITH OR WATCHING THE LAUNCHING.

### CAUTION.

EXPERIENCE HAS SHOWN THAT OCCASIONALLY EXCESSIVE WARPING OF THE WINGS OR OTHER PARTS MISALIGNMENT OR A SLIGHT OFF

BALANCE WEIGHT CONDITION MAY CAUSE THE SPACE PLANE TO SPIRAL OR LOOP IN ITS POWERED FLIGHT PHASE. IF THIS HAPPENS, CHECK ALL OF THE PARTS ALIGNMENTS AS PER ASSEMBLY INSTRUCTIONS. BE SURE THE ELEVONS HAVE NO PITCH ON THEM (EITHER UP OR DOWN) WHEN THE ENGINE IS INSTALLED. AS A LAST RESORT, WHEN ALL ELSE HAS FAILED AND YOU STILL DO NOT GET A GOOD VERTICAL FLIGHT, TRY REMOVING THE SPIN TABS AND GLUING THEM BACK ON WITH REVERSED PITCH SO THAT THE ROCKET WILL SPIN IN THE OPPOSITE DIRECTION.

## GET OUT THE PAINT.....

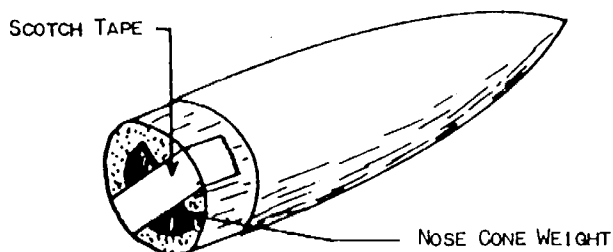
BEFORE STARTING TO PAINT, SAND THE LEADING EDGES OF WINGS AND STABILIZERS UNTIL ROUNDED. SAND THE REMAINING BALSA WOOD SURFACES UNTIL SMOOTH.

THE BEST COLOR TO PAINT THE ASTRON SPACE PLANE IS BLACK. IF YOU PREFER A TWO-TONE JOB, TRIM IT UP BY PAINTING THE

NOSE CONE AND OUTSIDE EDGES OF THE VERTICAL STABILIZERS FLUORESCENT ORANGE. TO KEEP THE WEIGHT DOWN, USE AS LITTLE PAINT AS POSSIBLE. BE CAREFUL NOT TO APPLY PAINT UNEVENLY SO ONE WING BECOMES HEAVIER THAN THE OTHER. REMOVE THE GLIDE ADJUSTING SCREWS BEFORE PAINTING.

## BALANCE IT.... OR IT WON'T FLY!!!

THE IMPORTANCE OF A PROPER BALANCE CANNOT BE OVER EMPHASIZED. THE PROPER BALANCING OF ROCKETS IS FULLY OUTLINED IN OUR TECHNICAL REPORT NO. TR-1 ON ROCKET STABILITY. THE ASTRON SPACE PLANE IS DESIGNED SO A GOOD GLIDE AND A GOOD ROCKET FLIGHT CAN BE OBTAINED, IF THE BALANCE POINT WITH THE ENGINE INSTALLED IS  $3 \frac{7}{8}$ " TO  $3 \frac{15}{16}$ " REARWARD FROM



THE FRONT OF THE FUSELAGE AS INDICATED IN THE TOP VIEW DRAWING. A PROPER BALANCE IS OBTAINED BY ADDING A SMALL WEIGHT TO THE NOSE OF THE GLIDER. USUALLY ABOUT  $\frac{1}{2}$  OF A NOSE CONE WEIGHT IS REQUIRED. CUT THE LEAD WEIGHT IN HALF WITH A PAIR OF SCISSORS. THEN USING SCOTCH TAPE OR A SIMILAR TAPE SECURE THE NOSE CONE WEIGHT INTO POSITION ON THE BACK OF THE NOSE CONE AS ILLUSTRATED.

INSERT THE NOSE CONE AND CHECK THE BALANCE. ADD OR REMOVE WEIGHT UNTIL THE BALANCE POINT ON THE SPACE PLANE IS EXACTLY  $3 \frac{7}{8}$ " TO  $3 \frac{15}{16}$ " FROM THE FORWARD END OF THE BODY TUBE (SEE POSITION INDICATED ON THE TOP VIEW OF THE PLANS). IF A PAYLOAD IS TO BE CARRIED IN THE PAYLOAD SECTION, SOME OR ALL OF THE WEIGHT MAY HAVE TO BE REMOVED. REBALANCE AND TEST GLIDE THE ROCKET EACH TIME THE WEIGHT OF THE PAYLOAD IS CHANGED. IF YOU DO NOT GET A GOOD VERTICAL FLIGHT, TRY ADDING MORE WEIGHT TO THE NOSE. HOWEVER, EXCESSIVE WEIGHT IS TO BE AVOIDED, SINCE THIS WILL REDUCE THE GLIDE EFFICIENCY.

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(GLIDE AND LAUNCH INSTRUCTIONS ON NEXT PAGE)

## Notice!

AS AN AID TO OUR RESEARCH AND DEVELOPMENT DEPARTMENT WE WOULD APPRECIATE YOUR COMMENTS ABOUT THE ASTRON SPACE PLANE. WOULD YOU KINDLY ANSWER THESE QUESTIONS AND SEND TO US AT OUR FACTORY IN PENROSE, COLORADO.

1. DID YOU FIND THE KIT EASY TO ASSEMBLE ( ), MEDIUM IN DIFFICULTY ( ), HARD TO ASSEMBLE ( )?
2. WERE THE ASSEMBLY INSTRUCTIONS ADEQUATE ( ), INADEQUATE ( ); EASY TO UNDERSTAND ( ), DIFFICULT TO UNDERSTAND ( )?
3. DID YOUR PLANE TEST GLIDE PROPERLY? YES ( ), NO ( ). WAS THE FIRST FLIGHT SATISFACTORY? YES ( ), NO ( ).
4. DID YOU USE A  $\frac{1}{2}$ A.B-2 ENGINE IN YOUR FIRST TEST FLIGHT? YES ( ), NO ( ). IF NOT, WHAT TYPE WAS USED? \_\_\_\_\_.
5. HAVE SUBSEQUENT FLIGHTS BEEN SATISFACTORY? YES ( ), NO ( ). IF NOT, WHAT WAS WRONG? \_\_\_\_\_.
6. DO YOU HAVE ANY SUGGESTIONS FOR IMPROVEMENT? YES ( ), NO ( ). IF SO, PLEASE WRITE IN THE SPACE BELOW ANY COMMENTS YOU MAY HAVE THAT WILL HELP US TO IMPROVE THIS PRODUCT.

NAME \_\_\_\_\_, AGE \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_, STATE \_\_\_\_\_

## TEST THE GLIDE BEFORE YOU LAUNCH.....

BY TURNING THE GLIDE ADJUSTING SCREWS, THE GLIDING CHARACTERISTICS OF THE ASTRON SPACE PLANE CAN BE CHANGED. IT IS BEST TO DETERMINE FIRST THE PROPER SETTING TO GET A STRAIGHT FLIGHT. TO DO THIS, SET THE ADJUSTING SCREW SO THE REAR EDGE OF THE LEFT ELEVON IS ABOUT 1/16" ABOVE THE ELEVON STOP AND THE TRAILING EDGE OF THE RIGHT ELEVON IS ABOUT 1/8" ABOVE THE ELEVON STOP. (SEE "GLIDE CONTROL CENTER" DRAWING.) NOTE: THE REASON THAT THE RIGHT ELEVON IS SET HIGHER THAN THE LEFT ELEVON IS TO COUNTERACT THE ROTATING FORCE PRODUCED BY THE SPIN TABS.

TO TEST THE GLIDE, GRASP THE MODEL BY THE BODY TUBE JUST AHEAD OF THE WINGS AND THROW IT THROUGH THE AIR INTO THE WIND AND NOTE WHICH WAY IT TURNS. IF IT MAKES A TURN TO THE RIGHT, DECREASE SLIGHTLY THE PITCH ON THE RIGHT ELEVON. IF IT CIRCLES OR TURNS TO THE LEFT, INCREASE THE

PITCH ON THE RIGHT ELEVON. REPEAT THIS TESTING AND ADJUSTING UNTIL THE MODEL GLIDES STRAIGHT AHEAD WHEN THROWN. TO SET THE GLIDER FOR A RIGHT TURN, INCREASE THE PITCH ON THE RIGHT ELEVON. (YOU CAN ADJUST THE LEFT ONE LOWER IF YOU PREFER.) FROM A STRAIGHT GLIDE TO A WIDE CIRCLE WILL REQUIRE ONLY A QUARTER TO ONE-THIRD TURN OF THE ADJUSTING SCREW. A CLOSE CIRCLE AND FAST RECOVERY CAN BE MADE BY TURNING THE ADJUSTING SCREW ONE-HALF TO ONE COMPLETE TURN. ON WINDY DAYS (10 TO 15 MPH WINDS) IT IS BEST TO SET THE GLIDE FOR A FAST RECOVERY AS DESCRIBED ABOVE. THIS IS TO KEEP YOUR GLIDER FROM LANDING TOO FAR FROM THE LAUNCH AREA. FOR CONTESTS AND EXHIBITIONS YOU WILL FIND THE ADJUSTABLE FEATURE VERY DESIRABLE. WHEN CARRYING PAYLOADS IT WILL BE NECESSARY TO INCREASE THE PITCH ON THE ELEVONS TO COMPENSATE FOR THE EXTRA WEIGHT IN THE NOSE.

## ZOOM!! AND AWAY IT GOES.....

THE ASTRON SPACE PLANE REQUIRES A NEW ROCKET ENGINE AFTER EACH FLIGHT. THE ONLY TYPES OF ENGINES RECOMMENDED ARE THE  $\frac{1}{2}$ A.8-2, THE A.8-3 AND THE B.8-4. FOR THE FIRST FEW TEST FLIGHTS USE THE  $\frac{1}{2}$ A ENGINE ONLY.

THE ASTRON SPACE PLANE, LIKE MOST OTHER MODEL ROCKETS, IS TO BE LAUNCHED USING A STANDARD 36" LONG LAUNCHING RAIL AND AN APPROPRIATE ELECTRICAL FIRING SYSTEM. THE ELECTRO LAUNCH MODEL ROCKET FIRING SYSTEM (ANOTHER PRODUCT OF ESTES INDUSTRIES) IS IDEAL. CONSULT OUR CATALOG OR THE STORE WHERE YOU PURCHASED YOUR MODEL FOR FURTHER DETAILS.

WHEN THE ROCKET ENGINE IS INSTALLED IN THE BODY TUBE THE ELEVONS WILL BE LOCKED IN A NEUTRAL POSITION FOR VERTICAL FLIGHT. CHECK VERY CAREFULLY TO BE SURE THERE IS NO POSITIVE OR NEGATIVE PITCH ON EITHER ELEVON. IF THERE IS ANY PITCH, EVEN THE SLIGHTEST AMOUNT, THE ROCKET POWERED PHASE

OF THE FLIGHT WILL NOT BE PERFECT. YOUR MODEL PLANE WILL SPIRAL IN FLIGHT RATHER THAN SPIN AS IT GOES UP. IF THE MISALIGNMENT IS SEVERE ENOUGH THE PLANE WILL GO OFF COURSE OR EVEN LOOP BACK TO THE GROUND UNDER POWER. WHILE FLYING AT LOW POWER FOR THE FIRST FEW FLIGHTS MAKE CORRECTING ADJUSTMENTS ON THE GLIDE AND FAMILIARIZE YOURSELF WITH THE GLIDE CONTROL ADJUSTMENTS. TRY FOR RIGHT TURNS, LEFT TURNS AND STRAIGHT GLIDE. TRY RESETTING THE ELEVONS TO NEW POSITIONS TO OBTAIN LONGER OR SHORTER DURATION FLIGHTS. TIME EACH FLIGHT TO SEE HOW LONG YOUR ASTRON SPACE PLANE STAYS IN THE AIR. DO NOT ATTEMPT TO USE ENGINES LARGER THAN THE  $\frac{1}{2}$ A UNTIL SUFFICIENT TEST FLIGHTS INDICATE THAT BOTH A GOOD VERTICAL FLIGHT AND A GOOD GLIDE ARE OBTAINED. WHEN A GOOD GLIDE IS OBTAINED, A  $\frac{3}{4}$ A ENGINE WILL PROVIDE A FLIGHT OF ABOUT 30 TO 40 SECONDS AND THE FULL A ENGINE ABOUT ONE MINUTE.

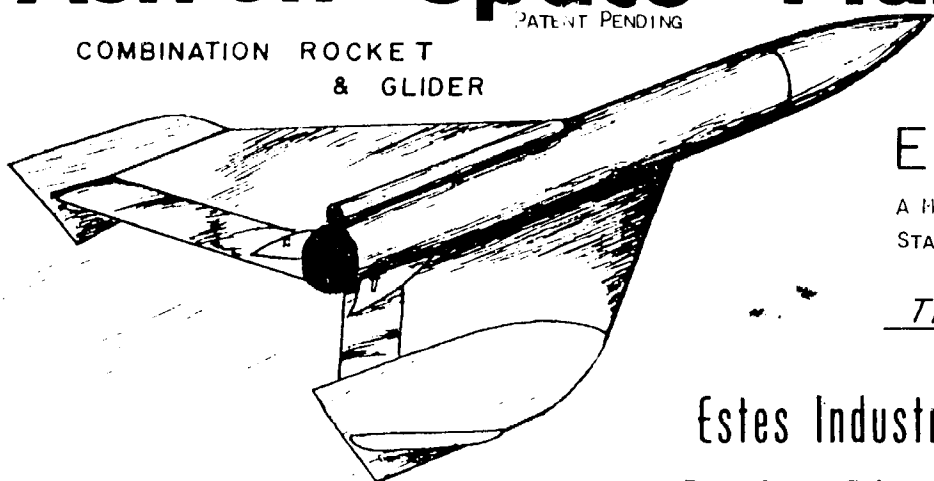
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# Astron Space Plane \$1.80

COMBINATION ROCKET  
& GLIDER

PATENT PENDING

ROCKET KIT NO. K-3



## ENTIRELY NEW !!

A MODEL ROCKET PATTERNED AFTER THE UNITED STATES REENTRY PROJECT "DYNA-SOAR"

THRILLING PERFORMANCE

Estes Industries, Inc. PENROSE, COLORADO

Devoted to . . . Safety . . . Education . . . Enjoyment . . . in rocketry

NOTE: EXACTLY CUT AROUND EACH PATTERN AS INDICATED IN THE INSRUCTIONS. CUT AROUND THE OUTSIDE EDGE OF THE MARK SO THE MARK ITSELF REMAINS ON THE PATTERN.

# FUSELAGE TUBE MARKING GUIDE

GUIDE LINE FOR RIGHT CONTROL TAB

GUIDE LINE FOR WINGS

1

GUIDE LINE FOR LEFT CONTROL TAB

GUIDE LINE FOR LAUNCHING LUG

ELEVON RECESS

SAVE THIS BODY TUBE MARKING GUIDE FOR MARKING FIN GUIDE LINES ON ALL 4 FIN ROCKETS MADE FROM BODY TUBE # BT-30

FRONT LANDING SKID 1 REQUIRED

DO NOT CUT

LEADING EDGE

LAYOUT GUIDE

3/32" x 3/4" x 3" REINFORCED Balsa STRIP

CONTROL TAB 2 REQUIRED

7 ATTACH HERE

8 ATTACH HERE

ELEVON LOCK TAB 2 REQUIRED

LEADING EDGE

POSITION FOR TAPE DISC

2

## WING PATTERN

CUT FROM 1/16" Balsa SHEET

POSITION FOR FORWARD EDGE OF HINGE

ELEVON ATTACHES ALONG THIS EDGE

10

SPIN TAB 2 REQUIRED

CUT FROM 1/16" Balsa SCRAP

RIGHT TOP INSIDE

3

RIGHT STABILIZER 1 REQUIRED

ATTACH TO WING TIP

WOOD GRAIN

LEFT TOP INSIDE

4

LEFT STABILIZER 1 REQUIRED

ATTACH TO WING TIP

WOOD GRAIN

5

ELEVON—2 REQUIRED  
CUT FROM 1/16" x 1/2" x 6" STRIP

PUNCH HOLE WITH BALL POINT PEN OR PENCIL.

FORWARD END

6

ELEVON STOPS 2 REQUIRED

CUT FROM 1/16" x 1/2" x 6" STRIP

TRANSFER WING ATTACHING AND SPIN TAB GUIDE LINES TO Balsa PART. THE DOTTED LINES FOR THE SPIN TAB ARE TO BE TRANSFERRED TO THE OPPOSITE SIDE FROM THE WING ATTACHING LINES.